

PATENT ABSTRACTS OF JAPAN

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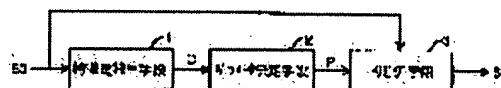
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(54) IMAGE CONVERSION METHOD, SYSTEM AND RECORDING MEDIUM THEREOF

(57)Abstract:

PROBLEM TO BE SOLVED: To allow a user to simply trim an image and convert a pixel density in a well-balanced way, without relying on his own experience.

SOLUTION: A characteristics amount extract means 1 extracts a missing point represented by image data S0 as a characteristics amount C. A parameter decision means 2 decides a parameter P for trimming on the basis of the characteristics amount C. Coordinates at four corners of a trimming range being the parameter P are obtained, so that the missing point of the image after the trimming becomes a reference point of the golden section ratio. A trimming means 3 trims the image on the basis of the parameter P to obtain trimmed image data S1.



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CLAIMS

[Claim(s)]

[Claim 1] The image transformation approach characterized by extracting the characteristic quantity of said image, determining the parameter for said image transformation based on this characteristic quantity in the image transformation approach of performing trimming of an image, and/or pixel consistency conversion, and changing said image based on this parameter.

[Claim 2] The image transformation approach according to claim 1 characterized by determining said parameter also based on information other than said characteristic quantity.

[Claim 3] Image transformation equipment characterized by having a characteristic quantity extract means to extract the characteristic quantity of said image, a parameter decision means to determine the parameter for said image transformation based on this characteristic quantity, and a conversion means to change said image based on this parameter, in the image transformation equipment which performs trimming of an image, and/or pixel consistency conversion.

[Claim 4] Said parameter decision means is image transformation equipment according to claim 3 characterized by being a means to determine said parameter also based on information other than said characteristic quantity.

[Claim 5] It is the record medium which is characterized by to have the procedure in which of said program extracts the characteristic quantity of said image in the record medium which recorded the program for making a computer perform the image-transformation approach of performing trimming of an image, and/or pixel consistency conversion, and in which computer read is possible, the procedure determine the parameter for said image transformation based on this characteristic quantity, and the procedure change said image based on this parameter and in which computer read is possible.

[Claim 6] The procedure of determining said parameter is a record medium which is characterized by being the procedure of determining said parameter and in which computer read according to claim 5 is possible also based on information other than said characteristic quantity.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the record medium which recorded the program for making the image transformation approach and equipment list which perform trimming of an image, and pixel consistency conversion perform the image transformation approach to a computer and in which computer read is possible.

[0002]

[Description of the Prior Art] When trimming the photographic subject considered as the request included in the scene of an image, it is carried out by starting the range considered to be suitable in consideration of the balance of arrangement of the photographic subject included in images, such as image size after trimming, a crest, and a building, etc. Moreover, also when carrying out pixel consistency conversion of the image so that it may become the size specified beforehand, in consideration of the balance of arrangement of the photographic subject in the image size after pixel consistency conversion, or an image, the logging range and dilation ratio of an image are set up like the case of trimming, and scaling of an image is performed.

[0003]

[Problem(s) to be Solved by the Invention] However, since logging of the range at the time of performing trimming or pixel consistency conversion and setting out of a dilation ratio were influenced by experience of those who work, it was difficult setting out to perform pixel consistency conversion so that those so much inexperienced may become the dilation ratio which starts the range which balance improves as a request appropriately, or is considered as a request.

[0004] This invention is made in view of the above-mentioned situation, and it aims at offering the record medium which recorded the program for making the image transformation approach and equipment list which can perform trimming of an image, and pixel consistency conversion simply perform the image transformation approach to a computer and in which computer read is possible.

[0005]

[Means for Solving the Problem] In the image transformation approach of performing trimming of an image, and/or pixel consistency conversion, the image transformation approach by this invention extracts the characteristic quantity of said image, determines the parameter for said image transformation based on this characteristic quantity, and is characterized by changing said image based on this parameter.

[0006] Here, it starts with balance [range / trimming] sufficient in case trimmings, such as a center-of-gravity location of a face and face area size, and/or pixel consistency conversion are performed in the case of the image with which "characteristic quantity" contains light source locations, such as a vanishing point in an image, a location of a horizontal line, and the sun, the center position of the face in the case of a portrait image, and two or more person object, or the thing of the value used as the criteria at the time of carrying out scaling is said.

[0007] With moreover, "the parameter for image transformation" [as which location a vanishing point, a

horizontal line, a light source location, the center position of a face, or the center-of-gravity location of a face is set, and] Moreover, it is a parameter for determining of which range to cut down an image on the basis of the set-up location, or as what magnitude face area size is set further. Specifically, the dilation ratio in consideration of the rate of a face field on the basis of the location of a vanishing point of as opposed to [start and] the size of the coordinate value of four corners of the range and the image after pixel consistency conversion serves as a parameter.

[0008] In addition, in the image transformation approach by this invention, it is desirable to determine said parameter also based on information other than said characteristic quantity.

[0009] Here, "information other than characteristic quantity" means things, such as an impression of the image after performing trimming, and image size after trimming.

[0010] The image transformation equipment by this invention is characterized by having a characteristic quantity extract means to extract the characteristic quantity of said image, a parameter decision means to determine the parameter for said image transformation based on this characteristic quantity, and a conversion means to change said image based on this parameter in the image transformation equipment which performs trimming of an image, and/or pixel consistency conversion.

[0011] In addition, in the image transformation equipment by this invention, it is desirable that said parameter decision means is a means to determine said parameter also based on information other than said characteristic quantity.

[0012] In addition, the image transformation approach by this invention may be recorded on the record medium in which computer read is possible as a program for performing a computer, and may be offered.

[0013]

[Effect of the Invention] According to this invention, the characteristic quantity of an image is calculated out of an image, in order for the parameter determined based on this characteristic quantity to perform trimming and/or pixel consistency conversion, image transformation can be performed without depending on an experience, and, thereby, the shallow person of an experience can also perform trimming and/or pixel consistency conversion with simply sufficient balance.

[0014]

[Embodiment of the Invention] With reference to a drawing, the operation gestalt of this invention is explained below.

[0015] Drawing 1 is the outline block diagram showing the configuration of the image transformation equipment by the 1st operation gestalt of this invention. A characteristic quantity extract means 1 for the image transformation equipment by the 1st operation gestalt to be for performing trimming of an image as shown in drawing 1, and to extract characteristic quantity C from image data S0, A parameter decision means 2 to determine the parameter P at the time of performing trimming based on the characteristic quantity C extracted in the characteristic quantity extract means 1, It has a trimming means 3 to perform trimming of an image with which it is expressed by image data S0 based on the parameter P determined in the parameter decision means 2, and to obtain the trimming image data S1.

[0016] The characteristic quantity extract means 1 asks for a vanishing point from the scene of an image expressed by image data S0, and extracts the location of this vanishing point as characteristic quantity C. Here, a vanishing point is a point that most straight lines contained in an image cross, and it can ask as follows. It asks for the straight-line component in an image like the approach first indicated by JP,6-314339,A. This approach performs differential processing to image data S0, extracts the edge component in an image, performs Hough conversion to the sequence of points of the extracted edge component, creates the histogram according to the function value of the Hough conversion, detects the peak point of the frequency of that histogram, and extracts the straight-line component corresponding to that detected peak point out of an image. And it asks for the intersection of the extracted straight-line component, and the point that most many straight lines serve as an intersection is searched for as a vanishing point. For example, in the case of what the image expressed by image data S0 shows to drawing 2, the center position of the location D of a round mark shown in drawing 3 is called for as a vanishing point.

[0017] The parameter decision means 2 determines the parameter P at the time of performing trimming based on the characteristic quantity C extracted in the characteristic quantity extract means 1. The coordinate value of four corners which appoint the range which cuts down an image is determined as a parameter P so that it may become the criteria location of the golden-section ratio of 1:1.618, as the location of a vanishing point specifically shows drawing 4 based on the location of the vanishing point which is characteristic quantity C, and the image size after trimming.

[0018] The trimming means 3 starts the range appointed by the coordinate value of four corners as shown in drawing 5 from the image expressed by image data S0 based on the parameter P determined in the parameter decision means 2, and obtains the trimming image data S1.

[0019] Subsequently, actuation of the 1st operation gestalt is explained. Drawing 6 is a flow chart which shows actuation of the 1st operation gestalt. First, the location of the vanishing point of the image expressed by image data S0 in the characteristic quantity extract means 1 is extracted as characteristic quantity C (step S1). And the coordinate value of four corners which appoint the range which cuts down an image based on characteristic quantity C in the parameter decision means 2 is determined as a parameter P (step S2). Based on the parameter P determined in the parameter decision means 2, the trimming means 3 cuts down an image, obtains the trimming image data S1 (step S3), and ends processing.

[0020] Thus, in order to determine the parameter P at the time of extracting characteristic quantity C from the image expressed by image data S0 in the 1st operation gestalt, and performing trimming and to perform trimming based on this parameter P, the good image range of balance can be trimmed without depending on an experience, and even if it is the shallow person of an experience of trimming, thereby, trimming can be performed with simply sufficient balance.

[0021] Subsequently, the 2nd operation gestalt of this invention is explained. Drawing 7 is the outline block diagram showing the configuration of the image transformation equipment by the 2nd operation gestalt of this invention. A characteristic quantity extract means 11 for the image transformation equipment by the 2nd operation gestalt to be for performing pixel consistency conversion of an image and trimming as shown in drawing 7, and to extract characteristic quantity C from image data S0, A parameter decision means 12 to determine the parameter P at the time of performing pixel consistency conversion and trimming based on the characteristic quantity C extracted in the characteristic quantity extract means 11, It has a conversion means 13 to perform the pixel consistency conversion of an image and trimming with which it is expressed by image data S0 based on the parameter P determined in the parameter decision means 12, and to obtain the resolution picture data S2. In addition, in the 2nd operation gestalt, the pixel consistency conversion and trimming showing the image which contains a person's face as shown in drawing 8 of image data S0 are performed.

[0022] The characteristic quantity extract means 11 extracts the face field which is a person's face from the image expressed by image data S0, and extracts the center position and magnitude of this face field as characteristic quantity C. Here, the extract of a face field can use the approach indicated by JP,6-314339,A. This approach asks for the histogram about a hue value based on image data S0. It divides into the group corresponding to the crest which decomposed the histogram for which it asked for every crest, judged to any of the crest which each pixel divided it would belong, and divided each pixel. A color picture is divided into two or more fields for every group, and when it judges whether the selected field is a person's face based on the configuration of the near field of the field chosen by choosing one of the divided fields and it is judged that it is a face, it extracts as a face field of the person of this field. As this shows drawing 9, two persons' face is extracted as a circular face field. And let the center position and magnitude of this face field be characteristic quantity C.

[0023] The parameter decision means 12 determines the parameter P at the time of performing pixel consistency conversion and trimming based on the characteristic quantity C extracted in the characteristic quantity extract means 11. As shown in drawing 10, while specifically asking for the center-of-gravity location G of a face field based on the center position and magnitude of a face field which are characteristic quantity C, the coordinate value of four corners which appoint the range which cuts down an image based on the image size after trimming so that this center-of-gravity location G may

turn into a center position of the image after logging is calculated. Furthermore, as shown in drawing 10, it asks for the dilation ratio at the time of performing pixel consistency conversion so that face area size may be set to one eighth of the area of the image cut down by trimming, and a coordinate value and a dilation ratio are determined as a parameter P.

[0024] The conversion means 13 performs trimming which cuts down the image expressed by image data S0 from the image expanded based on the coordinate value, and obtains the resolution picture data S2 showing the image shown in drawing 11 while it performs pixel consistency conversion to which image data S0 is expanded based on the dilation ratio contained in the parameter P determined in the parameter decision means 12.

[0025] Subsequently, actuation of the 2nd operation gestalt is explained. Drawing 12 is a flow chart which shows actuation of the 2nd operation gestalt. First, it asks for the center position and magnitude of a face field of a person which are contained in the image expressed by image data S0 in the characteristic quantity extract means 11 as characteristic quantity C (step S11). And the coordinate value of four corners which appoint the range which cuts down an image based on characteristic quantity C in the parameter decision means 12, and the dilation ratio in the case of pixel consistency conversion are determined as a parameter P (step S12). Based on the parameter P determined in the parameter decision means 12, the conversion means 13 cuts down an image based on a coordinate value, obtains the resolution picture data S2 (step S13), and ends processing while it performs pixel consistency conversion of image data S0.

[0026] Thus, the parameter P at the time of performing pixel consistency conversion and trimming in quest of characteristic quantity C in the 2nd operation gestalt from the image expressed by image data S0 is determined. In order to perform pixel consistency conversion and trimming based on this parameter P, the good image of balance will be obtained without depending on an experience, and even if it is the shallow person of an experience, thereby, pixel consistency conversion and trimming can be performed with simply sufficient balance.

[0027] In addition, although trimming and pixel consistency conversion are performed in quest of the coordinate value and dilation ratio which appoint the range of trimming as a parameter P in case pixel consistency conversion is performed so that it may become the size beforehand defined in the operation gestalt of the above 2nd In case pixel consistency conversion is carried out with the dilation ratio defined beforehand, you may make it set up the trimming range so that the range of a face image may be set to one eighth of all images in the expanded image. In this case, the coordinate value of four corners of the range which cuts down an image is calculated as a parameter P so that the center-of-gravity location G of an image may turn into a center position.

[0028] Moreover, the 2nd operation gestalt is also applicable to the system which creates a postcard. In this case, what is necessary is just to set up the dilation ratio and trimming range of an image according to the size of the range to insert, when inserting the image which includes a person in a postcard. For example, what is necessary is just to change a dilation ratio and the trimming range according to the size of the insertion range, when inserting an image as shown in drawing 13 in a postcard. As shown in drawing 14 (a), namely, when the insertion range is comparatively large As shown in drawing 14 (b), when it is satisfactory if the whole image is inserted, but the insertion range smaller than drawing 14 (a) is set up A dilation ratio and the trimming range are determined that a face field serves as a center position of the insertion range like the operation gestalt of the above 2nd, and the area of a face field is set to one eighth of the area of the insertion range as a parameter P. What is necessary is just to insert in a postcard the image which performed pixel consistency conversion and trimming based on this parameter P. Moreover, what is necessary is to determine a dilation ratio and the trimming range that a face field serves as a center position of the insertion range, and the area of a face field will become about [of the area of the insertion range] 1/2 from drawing 14 (b) when the insertion range is still smaller as a parameter P, as shown in drawing 14 (c), and just to insert in a postcard the image which performed pixel consistency conversion and trimming based on this parameter P.

[0029] Subsequently, the 3rd operation gestalt of this invention is explained. Drawing 15 is the outline block diagram showing the postcard creation structure of a system which applied the image

transformation equipment by the 3rd operation gestalt of this invention. As shown in drawing 15, this postcard creation system It is for compounding with the template data T0 showing image data S4 showing the image which contains a person's face as shown in drawing 16 (a) and (b), and the template which performs pixel consistency conversion of S5 and is shown in drawing 17, and obtaining the synthetic image data G0. Image data S4 and a characteristic quantity extract means 21 to extract characteristic quantity C from S5, A parameter decision means 22 to determine the parameter P at the time of performing pixel consistency conversion based on the characteristic quantity C extracted in the characteristic quantity extract means 21, A pixel consistency conversion means 23 to perform pixel consistency conversion of image data S4 and the image expressed by S5, and to obtain the resolution picture data S6 and S7 based on the parameter P determined in the parameter decision means 22, It has a synthetic means 24 to compound the resolution picture data S6 and S7 and the template data T0, and to obtain the synthetic image data G0. In addition, each image shown in drawing 16 (a) and (b) has a transparent background, and the magnitude of the face image contained in each image differs.

[0030] The characteristic quantity extract means 21 extracts the face field which is a person's face from image data S4 and the image expressed by S5 like the characteristic quantity extract means 11 in the 2nd operation gestalt, and extracts this face area size as characteristic quantity C. In addition, although characteristic quantity is extracted from image data S4 and each of S5, it explains as one characteristic quantity C here.

[0031] The parameter decision means 22 determines the parameter P at the time of performing pixel consistency conversion to each image data S4 and S5 based on the characteristic quantity C extracted in the characteristic quantity extract means 21. The face area size in each image expressed by each image data S4 and S5 based on the face area size which is characteristic quantity C asks for the dilation ratio at the time of performing pixel consistency conversion about each image data S4 and S5 so that it may become 1/50 of the area of a template shown in drawing 17, and specifically, it determines this dilation ratio as a parameter P. In addition, less than one dilation ratio, i.e., the dilation ratio at the time of reducing, is included in the dilation ratio called for here. Moreover, since face area size differs in image data S4 and the image expressed by S5, in order to make face area size become 1/50 of the area of a template, dilation ratios differ for every [each image data S4 and] S5. On the other hand, as shown in drawing 17, the reference points O1 and O2 which define the center position of the image compounded are recorded on the template, and the core of the image after pixel consistency conversion will be located in this location.

[0032] The pixel consistency conversion means 23 performs each image data S4 and pixel consistency conversion to which S5 is expanded (cutback according to less than one dilation ratio here) based on the dilation ratio expressed with the parameter P determined in the parameter decision means 22, and obtains the resolution picture data S6 and S7 showing the image which is shown in drawing 18 (a) and (b) and by which pixel consistency conversion was carried out. Although face area size differs in image data S4 and the image expressed by S5 here as shown in drawing 16 (a) and (b) Since a dilation ratio different, respectively is called for as a parameter P so that face area size may become 1/50 of templates to each image in the parameter decision means 22, In each image by which pixel consistency conversion was carried out as shown in drawing 18 (a) and (b), the face field in each image serves as magnitude of abbreviation identitas.

[0033] As the resolution picture data S6 and S7 and the template data T0 are compounded and it is specifically shown in drawing 19, the synthetic means 24 compounds the resolution picture data S6 and S7 and the template data T0, and obtains the synthetic image data G0 so that the core of an image expressed by the resolution picture data S6 and S7 may be located in the data O1 and O2 recorded on the template.

[0034] Subsequently, actuation of the 3rd operation gestalt is explained. Drawing 20 is a flow chart which shows actuation of the 3rd operation gestalt. First, it asks for a person's face area size contained in the image expressed by image data S4 and S5 in the characteristic quantity extract means 21 as characteristic quantity C (step S21). And in the parameter decision means 22, the dilation ratio in the case of pixel consistency conversion is determined as a parameter P based on characteristic quantity C

(step S22). Based on the parameter P determined in the parameter decision means 22, the pixel consistency conversion means 23 performs image data S4 and pixel consistency conversion of S5, and obtains the resolution picture data S6 and S7 (step S23). And the resolution picture data S6 and S7 are inputted into the synthetic means 24, are compounded with the template data T0 here, obtain the synthetic image data G0 (step S24), and end processing.

[0035] Thus, in order to determine the parameter P at the time of performing pixel consistency conversion in quest of characteristic quantity C in the 3rd operation gestalt from the image expressed by image data S0 and to perform pixel consistency conversion based on this parameter P, The good dilation ratio of balance can perform pixel consistency conversion to a template, without depending on an experience, and thereby, even if it is the shallow person of an experience, pixel consistency conversion can be performed with simply sufficient balance.

[0036] In addition, in each above-mentioned operation gestalt, although the location of a vanishing point, the center position of a face field, or face area size is extracted as characteristic quantity C, it is not limited to this and the location of the light source of the sun included in an image and the location of a horizontal line may be extracted as characteristic quantity C. In addition, the location of the light source should just set up the coordinate value of four corners which appoint the range which cuts down an image that what is necessary is to ask for the part with the highest brightness in an image, and just to ask for this part as a light source location so that the location of the light source may take the lead in an image as a parameter P. Moreover, the location of a horizontal line should just calculate the coordinate value of four corners which appoint the trimming range at the location of this horizontal line turning into a criteria location of a golden-section ratio that what is necessary is to ask for the location of a vanishing point like the operation gestalt of the above 1st first, and just to ask for the straight-line component which extends in the image Nakamizu common direction through this vanishing point as a horizontal line.

[0037] Moreover, in each above-mentioned operation gestalt, although the parameter P at the time of this performing trimming and pixel consistency conversion in quest of characteristic quantity C from an image is determined, based on other information like the impression of for example, an output image, Parameter P may be determined in addition to this. for example, in the image containing a person's face, in performing trimming and pixel consistency conversion like the operation gestalt of the above 2nd The information about the impression of output images, such as common", is inputted. "force:size" and "force to express the impression of an output image with the parameter decision means 12 with characteristic quantity C : in the case of "force:size" In quest of a dilation ratio, it may be made to make this into Parameter P so that it may become larger than one eighth of the images after trimming about the range of a face image.

[Translation done.]

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TECHNICAL FIELD

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PRIOR ART

[Description of the Prior Art] When trimming the photographic subject considered as the request included in the scene of an image, it is carried out by starting the range considered to be suitable in consideration of the balance of arrangement of the photographic subject included in images, such as image size after trimming, a crest, and a building, etc. Moreover, also when carrying out pixel consistency conversion of the image so that it may become the size specified beforehand, in consideration of the balance of arrangement of the photographic subject in the image size after pixel consistency conversion, or an image, the logging range and dilation ratio of an image are set up like the case of trimming, and scaling of an image is performed.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The outline block diagram showing the configuration of the image transformation equipment by the 1st operation gestalt of this invention

[Drawing 2] Drawing showing the image used for the 1st operation gestalt

[Drawing 3] Drawing showing the condition of having asked for the vanishing point

[Drawing 4] Drawing for explaining how asking for trimming size

[Drawing 5] Drawing showing the image after trimming

[Drawing 6] The flow chart which shows actuation of the 1st operation gestalt

[Drawing 7] The outline block diagram showing the configuration of the image transformation equipment by the 2nd operation gestalt of this invention

[Drawing 8] Drawing showing the image used for the 2nd operation gestalt

[Drawing 9] Drawing for explaining the extract of a face field

[Drawing 10] Drawing for explaining how asking for a dilation ratio and a trimming location

[Drawing 11] Drawing showing the image after pixel consistency conversion and trimming

[Drawing 12] The flow chart which shows actuation of the 2nd operation gestalt

[Drawing 13] Drawing showing the image used for postcard creation

[Drawing 14] Drawing showing the insertion condition of the image according to the magnitude of the insertion range

[Drawing 15] The outline block diagram showing the postcard creation structure of a system which applied the image transformation equipment by the 3rd operation gestalt of this invention

[Drawing 16] Drawing showing the image used for the 3rd operation gestalt

[Drawing 17] Drawing showing the template used for the 3rd operation gestalt

[Drawing 18] Drawing showing the image after pixel consistency conversion

[Drawing 19] Drawing showing a synthetic image

[Drawing 20] The flow chart which shows actuation of the 3rd operation gestalt

[Description of Notations]

1. 11, 21 Characteristic quantity extract means

1. 12, 22 Parameter decision means

3 Trimming Means

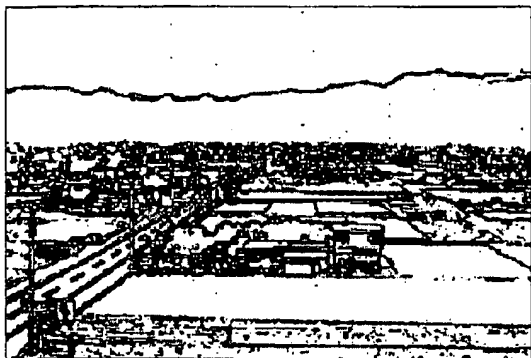
13 Conversion Means

23 Pixel Consistency Conversion Means

24 Synthetic Means

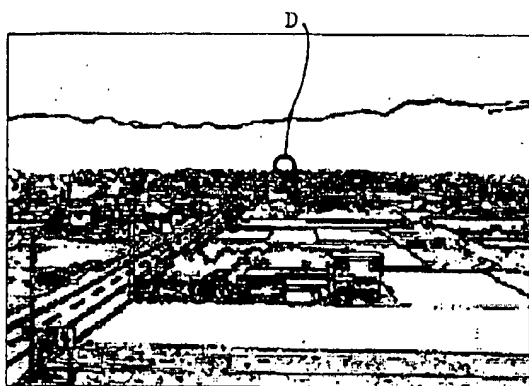
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Drawing selection drawing 2



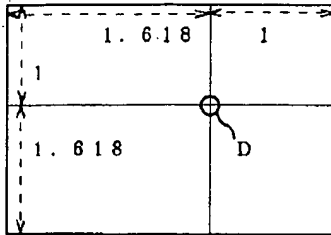
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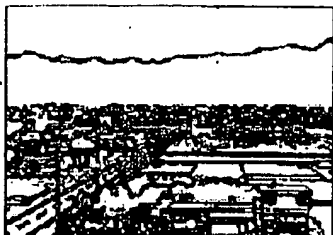
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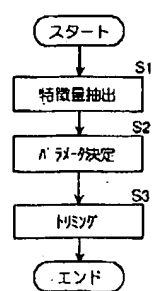
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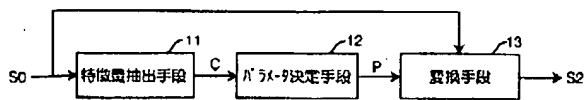
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Drawing selection drawing 7



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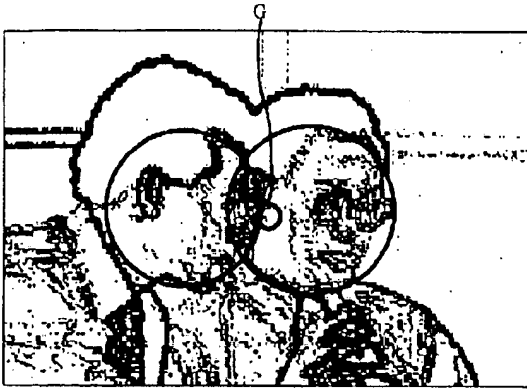
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Drawing selection drawing 10



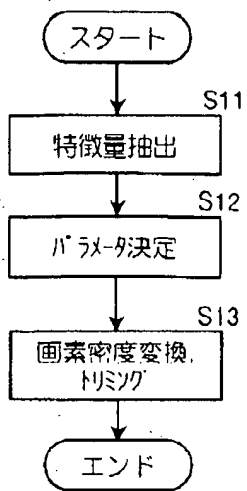
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Drawing selection drawing 12



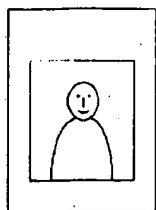
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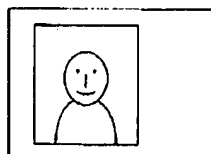


[Translation done.]

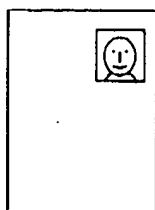
Drawing selection drawing 14



(a)



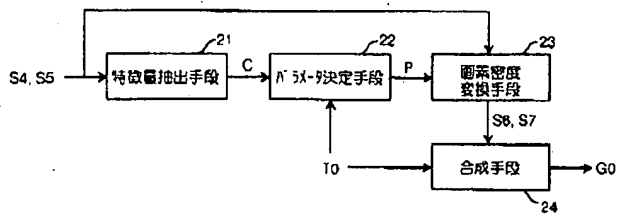
(b)



(c)

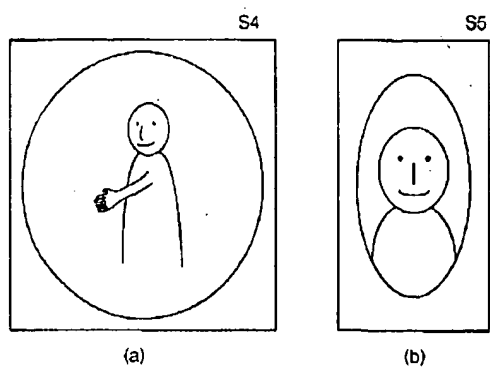
[Translation done.]

Drawing selection drawing 15



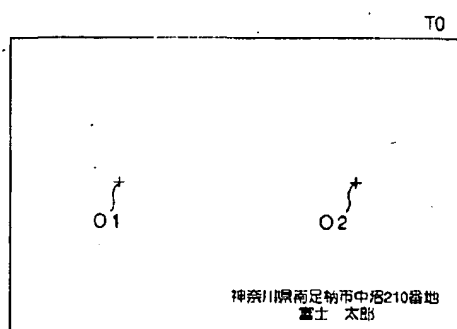
[Translation done.]

Drawing selection drawing 16



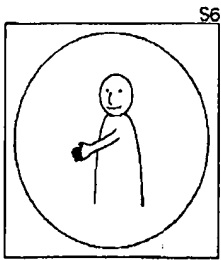
[Translation done.]

Drawing selection drawing 17



[Translation done.]

Drawing selection drawing 18



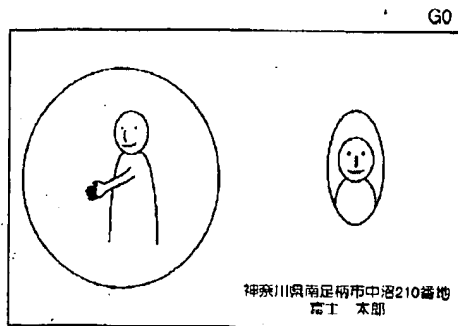
(a)



(b)

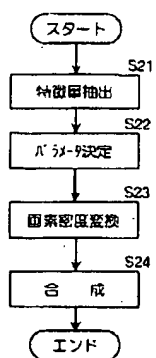
[Translation done.]

Drawing selection drawing 19



[Translation done.]

Drawing selection drawing 20



[Translation done.]